Early Results of User Profiles: Physicians' Opinions on the Use of Information Technology

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The role of physicians in today's managed care context is viewed as that of economic partner and clinical decision-maker, operating under the rules of professional autonomy and independence. To a considerable degree, physicians need to feel intrinsically motivated in order to change and adapt to new forms of health care delivery and information management. Today, health information managers use the rapid advances in telecommunications and computing technologies to plan and build vast health information networks, while at the same time receiving little support from systematic research to help understand, segment, and address the range of physicians' concerns and perceptions regarding these systems. This study's design employs a novel combination of qualitative and quantitative methods: first, to identify individual physician opinion profiles, and second, to group these profiles into clusters of similar perceptions. Opinions were obtained from primary care physicians in the Chicago area and resulted in four distinctly different profiles: Early Adopter, Traditional Family Doctor, Hesitant-Defensive Acceptor, and Unwilling-Uneasy Participant.

INTRODUCTION

Riley and Lorenzi suggest that no matter how good the technology, it is always people who will ultimately determine whether that new system will work well [1]. With clinicians, systems professionals often face a variety of reactions, ranging from enthusiasm, acceptance to reluctance, resistance. Today, researchers and experts alike agree that it is mission-critical to establish physician buy-in [2][3][4].

Thus far, research has provided few insights into why these different attitudes exist, and how best to address them to optimize and smoothen systems implementations. Some physicians' concerns can successfully be calmed by improving functionalities, security, and in general, by making the system more accessible and intuitive to use. For other physicians, functional improvements are not enough. They still do not want to use the system; and, for information managers, there do not seem to be any further interventions that could affect changes in these physicians' opinions.

Previous studies have succeeded in identifying a wide variety of resistance variables, most often summarized in groups representing technical, financial, psychological, organizational, and sociological factors [3]. To date, survey studies designed to assess physicians' opinions report these opinions as one composite "average" opinion;. for example, Detmer and Friedman [5] found --by asking academic physicians to assess the effect of computers on health care-- that most of those surveyed thought that computers would be detrimental to personal and professional privacy as well as to the clinician-patient relationship, while **at the same time** expressing that computers would also raise the quality of health care. Weir et al. [4] contrasted the opinions of two groups of people: support personnel and clinicians. Support personnel tended to emphasize organizational variables such as multidisciplinary and team approaches, whereas clinicians saw involvement of the chief of staff and administrative support as more important. The authors refer to motivational research by Gollwitzer [6], which has shown that individuals already committed to change tend to focus more on issues surrounding the actual implementation, whereas those still contemplating the change are more concerned with the pros and cons. The Weir et al. study, however, contrasted groups by occupational position, not by commitment to change, and, therefore, did not advance motivational theories.

In a summary article, Riley and Lorenzi [1] have associated physician resistance with: fear of revealing ignorance, fear of an imposed discipline, fear of wasted time, fear of unwanted accountability, and fear of new demands. The authors further point out that when dealing with physicians, all of the above concerns can appear in **varying combinations** among individuals within the group. These combinations, however, have received little research attention.

Researchers increasingly call for targeted educational activities [5] as well as for more refined assessments of attitudes to permit appropriately targeted

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interventions [7]. This study is designed to identify and group physicians' opinions, with the goal of developing targeted education and intervention methods.

When addressing the question "Where is the science in medical informatics?" Friedman [8] stated that validated scientific methods and approaches are not only needed at the level of technical model formulation, but also at the levels of planning and developing innovative computer-based systems, of installing such systems and then making them work reliably, and of studying the effects of these systems on the reasoning and behavior of health care providers, as well as on the organization and delivery of health care. The research reported here is designed to contribute to the body of systems implementation research (encompassing several of Friedman's levels) by furthering in-depth understanding of physicians' opinions regarding the use of information technologies in health care.

This study's approach is based on the assumptions that 1) opinions are subjective and can be shared, measured, and compared; and 2) change is internally motivated [9][10][11].

METHODS

The design uses a combination of qualitative and quantitative methods. First, a series of group discussions --incorporating both focus and nominal group techniques-- is conducted to elicit opinion statements regarding the issue under consideration [12][13][14]. Three group discussions were performed with primary care physicians and medical students, all affiliated with UIC's College of Medicine. Key questions for discussion were: "What do YOU think about the use of information technologies in health care? What do YOU like or dislike? What do YOU see as advantages or disadvantages?" The discussions resulted in 120 opinion statements.

Second, with the help of domain experts, a representative sample of 30 statements was selected to form the basis for the research instrument. Pilot-testing of the statement set and instructions was performed with a group of general internal medicine residents at Cook County hospital. Administration of this instrument is unlike the more common survey questionnaire that uses assignments of Likert-type ratings. Instead, participants are asked to represent their opinions through the rank-ordering of statements along a continuum from Most Agree to Most Disagree. For that purpose, each participant receives a set of the statements (each printed on a separate card), a sheet with sorting instructions, and a sheet to record the chosen order of statements. Each individual's rank-ordering of statements represents his or her own, valid opinion profile.

Participants in the main study included 12 third-year medical students from UIC, 16 UIC-affiliated family practice physicians, and 18 primary care physicians within the greater Chicago area who were not affiliated with the University (total of 46 participants). Ages ranged from 24 to 60 years. Twelve participants were female, 33 male, and one was undeclared. Participants from UIC were selected using a combination of purposive and convenience sampling techniques. Non-UIC physicians were contacted as a random sample by Blue Cross and Blue Shield of Illinois (BCBS).

In the third step, analysis and interpretation, all of the rank-ordered sorts are subjected to correlation and by-person factor analysis. This statistical analysis is not performed by variable or statement, but rather by person. This results not in the grouping of variables, but in the grouping of expressed opinion profiles based on the similarities and differences in which the statements were arranged by each participant. By-person factor analysis results in summarized opinion profiles for each "factor" (group of participants who ranked the statements in similar orders). It also provides statement scores that indicate where each statement fared in the summarized rankings.

This approach to opinion research is known as Q-technique, first developed and promulgated by William Stephenson in the 1930s [9][11][15][16]. The method has since been used in a broad range of scientific disciplines, spanning mostly the political and communications sciences, but also including psychology, nursing, medicine, and pharmacy [12][17][18][19][20].

RESULTS

The correlation and by-person factor analysis resulted in four distinct opinion profiles (factors) of practicing physicians: Early Adopter, Traditional Family Doctor, Hesitant-Defensive Acceptor, and Unwilling-Uneasy Participant.

Early Adopter

Nineteen sorts contributed to this factor: four medical students, nine family practitioners, and six BCBS physicians. Ages ranged from 24 to 60. Three were female, 15 male, and one undeclared. The factor is bipolar (with one BCBS physician loading negatively). In the following factor summary, only

the viewpoint expressed by the positively loading participants will be described.

Early Adopters think that information technologies will be useful to obtain patient eligibility data, and to provide access to electronic journals and article databases. They also believe that computer-based patient records (CPRs) will reduce problems of redundancy and inconsistencies, and that their use will be essential in the competition for HMO and other business contracts. Early Adopters do not believe that computers are hard to learn, that using them in the room with a patient present is depersonalizing, or that their use would allow for too much standardization in the delivery of medical care. They rank neutral the use of computers for personal research, the use of decision support systems, and telemedicine.

In general, Early Adopters feel positively toward the use of information technologies in health care. Expressed in a matter-of-fact way, they will use information technologies for whatever makes their lives easier, ranging all the way from patient and office management to sharing data with insurers and payors.

Traditional Family Doctor
Sorts from seven participants load on this factor: two medical students, three family practitioners, and two BCBS physicians. Ages range from 24-54. One participant was female, six were male.

Traditional Family Doctors also believe that the use of information technologies will improve patient care; however, from their point of view, improvements will be achieved by making patient management within the office more efficient, not by computer-assisted sharing of data with other health care providers and payors. They express strong concerns that confidentiality and security are bigger problems with computerized than with paper records. Their attitude toward CPRs is neither positive nor negative. Statements suggesting that CPRs might be essential for contracting, might help reduce redundancies and inconsistencies as well as legal liabilities by forcing physicians to take better notes --all receive neutral positions in their ranking of statements. They view negatively the use of computers for personal research and for electronic access to journal and article databases. In addition, these Traditional Family Doctors worry that computer vendors might be able to manipulate them because the physicians feel somewhat naive when it comes to computers.

In sum, Traditional Family Doctors believe that computers are useful for increasing efficiency within the office. Their attitude turns negative or at least disinterested, however, when it comes to sharing data with HMOs and other payer organization. This also holds true when it comes to the question of assessing their own performance. Traditional Family Doctors believe that this should best be done by observing the physician directly, not by computer monitoring.

Hesitant-Defensive Acceptor
Three physicians form this factor: one family practitioner and two BCBS physicians. Ages range from 27-43. Two participants were female, one male.

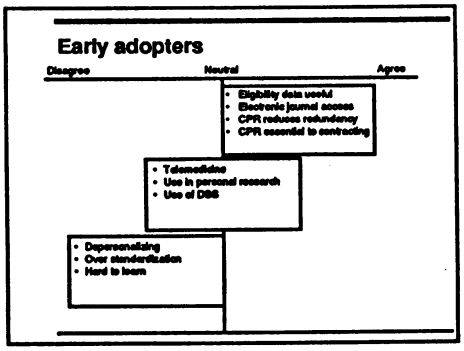
Hesitant-Defensive Acceptors want to use information technologies to access electronic journals and article databases. In addition, they feel positively toward the use of computers to further their own research and do not believe that technology vendors could manipulate them easily. Hesitant-Defensive Acceptors strongly disagree with the idea that the use of CPRs might be essential to contracting. Their reactions toward the use of information technologies to access patient eligibility data, or records across their own office sites, fall within the neutral range of the ranking scale. Even more negative are their attitudes toward exchanging E-mail with patients and having electronic access to social service agencies.

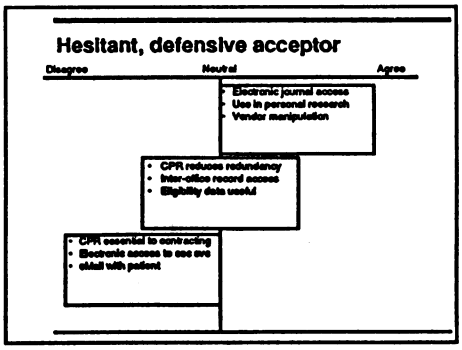
In sum, Hesitant-Defensive Acceptors feel positively in terms of using computers for their own research and for keeping up-to-date with medical knowledge; however, as soon as it comes to sharing patient information, even if it is only across their own office sites, not to mention with HMOs and other payors, their attitudes turn negative.

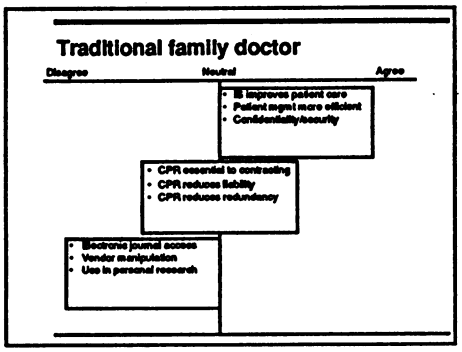
Unwilling-Uneasy Participant
In the early results, this factor is only defined by one participant, a primary care physician. The physician's view was included because it forms a distinct position and might have a stronger representation in the larger population of primary care physicians.

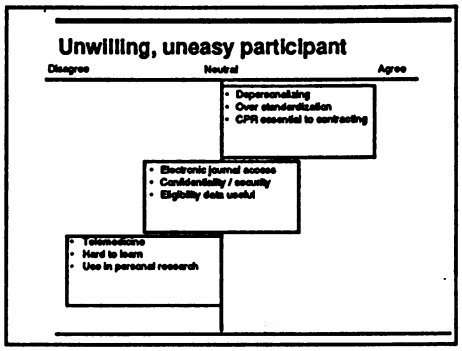
This Unwilling-Uneasy Participant considers using a computer in the room with the patient as depersonalizing and believes that the use of information technologies will allow for too much standardization in health care. Despite these professional concerns, the physicians agrees that the use of CPRs is essential in the competition for HMO and other business contracts, but feels neutral toward applications such as electronic access to journals, as well as to patient eligibility data. The physician is not interested in using computers for personal research or telemedicine purposes.

Even though this physician seems to be largely suspicious of the use of information technologies in









health care, this is not due to insecurity about personal computer skills. In fact, the physician does not find computers hard to learn. Rather it seems that the unwillingness to use information technologies has to do with personal philosophy of medicine.

In sum, the four factors --Early Adopter, Traditional Family Doctor, Hesitant-Defensive Acceptor, and Unwilling-Uneasy Participant-- show the differences in types of opinions that do exist among primary care physicians when it comes to assessing the value of information technologies in health care.

DISCUSSION

To optimize information systems implementation and training, physicians' concerns need to be addressed effectively. Numerous researchers have called for targeted interventions in medical education and systems training. So far, however, the practice of targeting interventions has largely been focused on distinguishing between and improving different levels of technical skills.

Early findings suggest that physicians' opinions of information technologies are not just determined by technical functionalities, but are also being influenced and at times even overshadowed by more philosophical concerns, such as the ethics of medicine and the realities of modern medicine in an increasingly managed care marketplace. By examining the four types of opinion profiles in this study --Early Adopter, Traditional Family Doctor, Hesitant-Defensive Acceptor, and Unwilling-Uneasy Participant-- it appears that these practitioners use different types of criterion frameworks to form and express their opinions of information technologies. Some physicians appear to react rather matter-of-factly (Early Adopters), others fear intrusion on the doctor-patient relationship (Traditional Family Doctor) or resonate themes of deprofessionalization and over-standardization in medicine (Unwilling-Uneasy Participant). Positive attitudes toward use are not always associated with computer literacy. While

Traditional Family Doctors and Unwilling-Uneasy Participants indicate familiarity with computers (neither finding them hard to learn, nor fearing manipulation by computer vendors), they nevertheless are opposed to a variety of envisioned uses for information technologies in health care. This is true especially when it comes to sharing data with other providers and payors or being measured against managed care standards and guidelines.

For system trainers, understanding opinion profiles helps them to target interventions to the particular needs of each identified opinion category. In particular, it allows the distinction between practitioners who will be amenable to technical improvements and those who will need further convincing in terms of the pros of networking and managed care philosophies.

The authors recognize the proportional representation of participants who were associated with each opinion type is subject to the influence of non-random sampling technique as well as participants' self-selection. Accordingly, these early results should be generalized with caution. The identified opinion profiles, however, are valid representations of actual physicians' opinions. Generalizations from early findings should not be based on their numerical distribution, but rather on the validity and theoretical implications of the expressed opinions.

This paper reports early findings. The authors have continued to gather data from medical students and primary care physicians. Differentiating as well as common themes and concerns are being clarified. Opportunities to affect systems training, based on these profiles, are being examined.

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